Spring 2014

Training graduate clinicians to implement speech language pathology, occupational therapy and applied behavior analysis goals in their treatment sessions

Heather B. White
James Madison University

Training Graduate Clinicians to Implement Speech Language Pathology, Occupational Therapy and Applied Behavior Analysis Goals in Their Treatment Sessions

Heather B. White

A thesis submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

Partial Fulfillment of the Requirements

for the degree of

Master of Arts

Department of Graduate Psychology

May 2014

Table of Contents

List of Figures

Abstract

Past literature indicates an interest in collaborative treatment for children with autism spectrum disorder (ASD) and names several therapeutic interventions. Effective treatments include Occupational Therapy, Speech Language Pathology and Applied Behavior Analysis. All three fields value best pracitce and, with differing perceptions and emphasizes, translate evidence into clinical practice. The current investigation used scientific literature and interdisciplinary collaboration to train graduate students from each field to integrate techniques from the other two fields into their own, supervised treatment sessions. Training was introduced serially across participants in a concurrent multiple baseline design. Instruction, rehersal, modeling and feedback were used in training. Coaching occurred as a continuation of the initial training during probe sessions, using a bug-in-the-ear system to ensure immediacy of feedback. This project found the serial introduction of trianing to be effective. Generally, clinicians exhibited higher implementation of goals following intervention. This project helped in the development of a protocol for merged treatment among Occupational Therapy, Speech Language Pathology and Applied Behavior Analysis in the Interprofessional Autism Clinic at James Madison University. Results for this study strive to influence the way treatment occurs for children with ASD.

Training Graduate Clinicians to Implement Speech Language Pathology, Occupational Therapy and Applied Behavior Analysis Goals in Their Treatment Sessions

Autism Spectrum Disorders (ASD) are characterized by the DSM 5 as impairments in social interaction and restricted yet repetitive behaviors (American Psychiatric Association, 2013). These criteria differ from the DSM-IV in that the former has two categories whereas the later includes three: deficits in "...social reciprocity, communicative intent and restrictive and repetitive behaviors" (Hyman, 2013). Several organizations name varying therapies and interventions for children with ASD: Occupational Therapy (OT) and aspects of it including sensory integration, speech therapy, physiotherapy, psycho-therapy, applied behavior analysis (ABA) and dietary considerations (Center for Disease Control, 2013; National Autistic Society, 2012).

Effective programs and comprehensive plans for children with ASD have also been assessed. Specific goals of these programs include increased effective communication, increased social interaction, teaching everyday life skills and decreased problem behaviors (National Autistic Society, 2012). Of the 10 programs assessed by the National Research Council, seven included behavior approaches, five included aspects of speech or communication training and two involved approaches and goals from occupational therapy (National Research Council, 2001). The Interprofessional Autism Clinic (IPAC) is a training program at James Madison University which offers collaborative assessment and treatments from OT, SLP and ABA. Undergraduate and graduate students work together with licensed clinicians to develop and implement interprofessional treatment for children with ASD (Baird Center, 2013).

Occupational therapy is concerned with the occupations, or everyday activities, of the client (American Occupational Therapy Association (AOTA), 2009). Although some use the words "occupation" and "career" interchangeably, work is just one “area of occupation” included in the domain of OT as described in the Occupational Therapy Practice Framework-2nd edition (OTPF) (AOTA, 2008). Education, play and social participation are examples of other areas of occupation addressed by OTs. OT interventions focus on multiple aspects of performance, including physical, cognitive, psychosocial, and sensory functioning, to promote or enhance health and participation in occupations. Treatment can occur in a variety of settings (Schaaf & Miller, 2005; AOTA, 2004). To establish effective therapy, the occupational therapist and client, or client’s family, are in continuing collaboration and their input, including evaluation of progress, is essential throughout. Because a significant number of sensory processing challenges are reported in children diagnosed with autism. OTs often utilize a sensory integrative approach as part of their intervention plan (Schaaf & Miller, 2005).

The field of Speech Language Pathology addresses communication and swallowing difficulties for individuals across the lifespan in order to improve a person's quality of life in an array of settings (American Speech-Language-Hearing Association (ASHA), 2007). Communication includes making sounds, making sounds so other people can understand them and understanding what is said by others, verbally or non-verbally. Good communication such as memory, problem solving and joint attention are also addressed. In practice, clinicians use techniques based on evidence. Therapists are encouraged to use data to inform their judgments for future directions of treatment (ASHA, 2007). Two roles of SLPs in autism intervention are increasing spontaneous

communication and functional communication to replace problem behaviors (ASHA, 2006).

ABA targets activities that are socially significant. It concentrates on functional relationships between an intervention and the change it produces (Baer, Wolf & Risley, 1968; Behavior Analysis Certification Board (BACB), 2010). Behavior analysts assess behavior, develop behavior change plans based on antecedent and consequence adjustments, evaluate progress of the plan. Treatment adapts as a result of direct observation-based data (BACB, 2010).

Although therapeutic techniques can differ among OT, SLP and ABA client goals are often similar. For example, a client goal could be learning to play with peers. The speech component could be teaching specific sounds or communication skills. The occupational therapist could teach engagement in different toy activities, with different sensory properties, to make social interaction more probable. A behavior analyst could address problem behaviors such as motivation for engagement, lack of turn taking and time on-task. If the child has a good foundation of skills with collaborative, interprofessional input from different fields, they could be more successful. Learning to play with peers does not just encompass aspects from one field, but the fields could address the goal as a team.

Collaboration is defined by Webster as engaging with someone or a group of people to meet a common goal (Meriam-Webster, 2013). Collaborative practice is defined by the World Health Organization as professionals from different fields working together when delivering services. In their 2010 survey, medical professionals are the majority represented for collaborative practice; OT, SLP and Psychologists represent

19.5% of the professionals engaged in educational programs involving interprofessional input (World Health Organization, 2010). The Occupational Therapy Practice Framework (OTPF), ASHA and The Behavior Analyst all indicate the value of input from all relevant professionals in treatment. The Occupational Therapy Practice Framework emphasizes collaboration with the client and consideration of the context the client is in, which includes other professionals, to produce effective treatment outcomes (AOTA, 2008). ASHA discusses collaboration during assessment and emphasizes the role of a Speech and Language Pathologist as an interdisciplinary team member (ASHA, 2007). The Behavior Analyst discusses collaboration with other professionals as the way to move Behavior Analysis ahead. Keeping the integrity of each field while collaborating is imperiative. However, St. Peter (2013) stresses the importance of not diluting or spreading behavior analysis too thin (St. Peter, 2013). This applies to the other fields as well. The purpose of collaborating is to enhance treatment, not to overtake one field by introducing another.

Choosing a Treatment Model

Past literature describes different coordinated teams of professionals as multidisciplinary, interdisciplinary and transdisciplinary (Campbell, 1987). In the multidisciplinary approach, professionals have their own goals and implement the treatments potentially in the same day or week, but there is little collaboration among the disciplines (Korner, 2010). The transdiciplinary model shows an evaluation and intervention implemented simultaneously. Input from the other disciplines are incorporated into a comprehensive treatment plan and the treatments are implemented with the professionals simultaneously, potentially in the same treatment session (Martini,

Metthé, Savard, Dubouloz & Klaiman, n.d). In an interdisciplinary approach, the professionals write goals with input from other professionals on the team and have meetings frequently to discuss progress. In this model, typically professionals implement treatment with similar goals in separate treatment sessions (Korner, 2010).

Cup and colleagues (2007) compared the effectiveness of collaborative teams with usual practice teams. In their study, neuromuscular patients experienced usual practice by being refered for OT treatment but not for SLP or physical therapy (PT). Even though these patients would benefit from the other treatments, it was not commonplace. In their study they compared usual practice with multidisciplinary approaches in neuromuscular patients who would benefit from OT, SLP and PT services. Clients showed preference for the multidisciplinary approach by reporting appreciation for the individualized and thorough treatment. Clients expressed "…attention paid to their specific needs" was a welcomed change to this new method of treatment. Costs were minimized using the multidisciplinary model; treatment was more efficient and cost effective. Patients valued input from multiple professionals and were not attached to traditional ways (Cup, Pieterse, Knuijt, Hendricks, van Engelen, Oostendorp & van der Wilt, 2007).

Researchers evaluated a medical model and gave staff a questionaire which inquired about teamwork and satisfaction in multidisciplinary versus interdisciplinary workplaces. Teamwork included aspects such as acomplishing tasks. Satisfaction encompassed communication among team members. Interprofessional teams scored higher on teamwork, workplace satisfaction, and staff satisfaction than multidisciplinary teams (Körner, 2010). Multidisciplinary team members acknowledge the importance of

collaboration and advice from others (Simpson, Bowers, Alexander, Ridley & Warren, 2005).

James Madison University's Taskforce Report for Collaborative Education indicates many benefits of treatment from multiple disciplines provided simultaneously in a merged fashion. A goal of the taskforce is to create an educational environment in which students intentionally collaborate and seek input from each other. They hope this fosters value and respect for other fields. Their report cites studies which found increased innovation in treatments and staff motivation due to interprofessional collaboration. Innovative treatment benefits students' learning and client success and could minimize costs of treatment. The taskforce emphasized a need for research and education, which involve interprofessional efforts. Intentional and respectful communication among students studying different disciplines is imperative (Akerson, Hammond, Hargens, O'Donoghue, Stanford, Stewart & Stokes, 2013).

Translating Research to Practice

OT, SLP and ABA value intervention planning and assessment, implementing procedures associated with the plan and evaluating its effectiveness (AOTA, 2008; ASHA, 2007; BACB, 2010; Campbell, 1987). These three fields work with children with special needs, particularly children with problem behaviors and children with autism. There are procedures specific to each field that clinicians use more frequently.

Literature about evidence-based assessment in attention deficit hyperactivity disorder encourages intervention which addresses core deficits and symptoms outlined by the current DSM. At the time of the article, the DSM-IV was written and commonly used. The idea from this article is to use diagnostic criteria at present to guide intervention

goals (Pelham, Fabiano, Massetti, 2005). Evidence based assessments involving children with autism also address focused attention issues. An indicator of an effective intervention is one in which there is social significance and functional skills are developed. Ozonoff and colleagues (2010) suggested changes in adaptive behavior and quality of life as two targets of an effective response to intervention (Ozonoff, Goodlin-Jones & Solomon, 2010). Eyberg and colleagues (2008) assessed many treatments for children with disruptive behavior. Within their conclusion of effective and evidence based treatments, clinicians differed in their experience level. Some studies used liscensed therapists with experience, master's level therapists or graduate student clinicians (Eyberg, Nelson & Boggs, 2008). Evidence based practice for OT, SLP and ABA has differing emphases and perceptions. Therefore, a collaborative definition that incorporates all three fields is necessary to create an effective, interprofessional intervention.

Dubouloz and colleagues (1999) surveyed occupational therapists' perceptions of evidenced based practice. Participants indicated the importance of balancing scientific literature and the the client's preferences. When balancing research and practice, they viewed it as conflicting and threatening to interdisciplinary relationships (Dubouloz, Egan, Vallerand & von Zweck, 1999). Another study found more than half of surveyed occupational therapists reported using research when developing treatment. Also, more than half discussed a need for more implementation of research-based findings in treatment (Dysart & Tomlin, 2002).

Speech language pathologists are implementing evidence based practices more regularly and there are challenges associated with it. Consulting with other clinicians and

prior experience is a commonly used effort for clinical decision making, more so than evidence from literature (Zipoli & Kennedy, 2005). A sole focus on scientific evidence was cautioned. They emphasized clinical experience and consult with other SLPs. However, there were inconsistencies in findings. A broader knowledge base, based on experience, in order to determine the best evidence is necessary (Dodd, 2007). Unlike OT literature, it was difficult to determine SLP perceptions of evidence based practice.

Behavior Analysis is a nationally recognized, evidence based treatment for ASD. Lovaas (1987) conducted a randomized trial for treatment of autism using behavior analysis. One group received 40 hours per week of ABA whereas the other group received 10 hours or fewer. Following treatment, 10 of the 19 children in the experimental group tested in a normal IQ range as compared with only two at the beginning of the study. 47% of children in the experimental group were able to pass first grade in a typical classroom in public school (Lovaas, 1987). The US Surgeon General, National Institute of Mental Health, Autism Society of America, and the American Psychology Association recognize ABA as an evidenced-based and effective treatment for ASD (California Department of Insurance) and insurance covers ABA treatment for autism (National Conference of State Legislation, 2011).

It appears a working definition of evidence based practice while collaborating with OTs, SLPs and Behavior Analysts needs to incorporate values and emphases from each field. Evidence based practice is, as Sackett (1996) indicates, evidence that impacts clinical practice (Sackett, 1996). But what constitutes evidence needs to be more broad than is stereotypically thought as research evidence. It should include clinical experience, consultation with other experienced clinicians and reputable research findings. In order to

determine important techniques from each field, an interview with an occupational therapist, a seech and language pathologist and behavior analyst was conducted. Training was set up in a peer-consult fashion and a review of literature on the techniques indicated is presented.

The occupational therapy techniques selected include introduction of new sensory stimuli during sessions and proper prompting through resistance to stimulus introduction. Occupational therapists call resistance to stimuli "sensory defensiveness" or sensory avoiding. Wilbarger & Wilbarger (1991) define sensory defensiveness as an aversive, negative reaction to a stimulus which is not commonly aversive (Wilbarger & Wilbarger, 1991),. Schaaf & Miller (2005) discuss aspects of the sensory integration approach to occupational therapy treatment. They indicate the importance of challenging the child's sensory system by incorporating varied sensory input. Upon an instance of sensory defensiveness or avoidance, the therapist is to guide the child through the activity providing the “just right challenge” (Schaaf & Miller, 2005).

A common technique occupational therapists use in treatment, particularly in sensory integration interventions, is to provide opportunities to engage in sensory rich activities that provide tactile, vestibular and proprioceptive input. This was the most frequently used technique in a metaanalysis on common OT techniques (Parham, Cohn, Spitzer, Koomar, Miller, Burke, Brett-Green, Mailloux, May-Benson, Roley, Schaaf, Schoen & Summers, 2007). Case-Smith & Bryan (1999) investigated occupational therapy which emphasized sensory integration techniques for children with autism. Therapists introduced a variety of stimuli to the child as part of their procedure for

implementing sensory integration. Following intervention, children engaged more with peers and adults and displayed more play behaviors (Case-Smith & Bryan, 1999).

The speech and language pathology techniques selected are expansions of utterance and reinforcement following a communication outcome. Girardeau & Spradlin (1970) discuss the common use of praise following a communication outcome in speech sessions. At times, a supplement to the praise could be necessary (Girardeau & Spradlin, 1970). The Speech Therapy Manual by Roth and Worthington (2011) explain certain techniques which involve reinforcement based on communication outcomes. Specifically, it outlines steps in the speech therapy process: present a stimulus, wait for a response and give an appropriate consequence (Roth & Worthington, 2011). Using reinforcement following a communication outcome has been found in the experimental literature to be impactful for children with autism (Koegel, O'Dell, Dunlap 1988).

The current model of speech-language therapy in the clinic involves aspects from The Hanen Program in that it follows the child's lead. It also incorporates forced stimulation in that there are many verbal models used to repeat what the child has just said (Gladfelter, Wendt & Subramanian, n.d.). A metaanalysis of effective speech-language pathology techniques used by clinicians in the literature found that expansions and child directed speech were among a grouping of effective techniques for improving language. Specifically, these techniques lengthened word use and the child used varied words as a result (Gladfelter, Wendt & Subramanian, n.d.).

Behavior analysis techniques selected are pausing during demand sequences and differential attention to active listening and joint attention. Behavior Analysis literature uses a five-second pause procedure in command sequencing. This procedure, along with

interventions involving reinforcement for complying, increased child compliance (Russo, Cataldo & Cushing, 1981). Parent Child Interaction Therapy procedure instructs parents to pause for five seconds in between the demand to allow for a response from the child. If the person delivering the command or question does not pause, it is coded that there was no opportunity for compliance (Eyberg, 2010). Interestingly, this is categorized and coded as child behavior, but by not pausing, the parent is at fault for not allowing an opportunity to comply.

A common technology in behavior analysis is differential attention procedures to increase desired behaviors (Cooper, 2007). Giller (2011) investigated the use of differential attention to decrease problem behaviors and increase appropriate behavior in preschool children. Upon implementation of differential attention procedures, children decreased undesired behaviors, which includes non-compliance or off task behaviors, and increased desired behaviors such as compliance. Also, teachers were trained in executing these procedures. Following intervention, teachers consistently showed attention to appropriate behaviors and inattention to inappropriate behaviors (Giller, 2011).

Training Paraprofessionals

A common interdisciplinary team for individuals with special needs is the Individualized Education Plans (IEP) Team. It consists of licensed professionals in multiple fields, families and clients who receive the services. Researchers assert "...there is no systematic training process for school personnel who must integrate their skill with those of others to formulate a comprehensive educational plan" (Smith, 1990). Professionals in one subject area must learn to execute collaborative goals, and do so in a

way that is methodological and effective for students. A training protocol for integrated skills is necessary.

The common interdisciplinary treatment team involves professionals, families and the client himself and omits paraprofessional during many aspects of collaboration. The 1997 reauthorization of Individuals with Disabilities Education Act allows paraprofessionals to deliver services to children with special needs as long as they are properly trained and supervised (Giangreco, Edelman, Broer & Doyle, 2001).

Someone who is a licensed professional in one field may act as a paraprofessional to implement goals from another field. For example, a special education teacher may act as a licensed teacher, but if she incorporates OT goals, she acts as a paraprofessional. When a professional is supervised and delivers treatment goals that are not explicitly in their scope of practice, it is an indirect service (Giangreco, Edelman, Broer & Doyle 2001). If someone acts as a paraprofessional do they deliver the treatment goals effectively?

As stated by Giangreco et. al,, it is important to recognize that the implementation of goals may be more effective by a licensed professional as compared to a paraprofessional. The client is "'…in dire need of continuous exposure to the most ingenious, creative, powerful, competent, interpersonally effective, and informed professionals'" (Giangreco, Edelman, Broer & Doyle, 2001). In rebuttal, there has been research to show that supervised paraprofessionals can implement goals in a way that children succeed. Research suggests that paraprofessionals can implement goals and their implementation of these goals positively impacts client outcomes.

Auster and colleagues used conjoint behavior consultation to help with professional and parent collaboration on goals, monitoring progress and discussion of treatment outcomes. They cited Dadds and Rapee (1996) who found that receiving treatment with a researcher and parent showed more improvements than with just the researcher (Barrett, Dadds & Rappe, 1996; Auster, Feeney-Kettler & Kratochwill, 2006). A parent can be trained to implement treatment under the supervision of the professional in the field. When the child interacted with the treatment goals more often, they showed more improvements.

Bethune & Wood (2013) trained special education teachers to implement functional assessments on children with special needs. Because functional assessments were not explicitly in the teachers repertoire, they were paraprofessionals while doing this task. In this study, they used a checklist to measure the efficacy of implementing skills in the functional assessment. Training consisted of a workshop and coaching. The accuracy of implementing these goals met the mastery criterion of 90% or above during coaching and maintained overtime. Teachers implemented this technique from a field outside of their own and did so with incredible accuracy (Bethune & Wood, 2013).

Laws, Brown, Epstein and Hocking (1971) were approached by a paraprofessional conducting a reading program to children with special needs in a school. The paraprofessional sought experts consultation to reduce behavior problems. Researchers trained the paraprofessional to differentially reinforce: to attend to correct responses to questions, ignore problem behavior and verbally correct incorrect responses. He learned to implement these techniques when appropriate and ceased when instructed. When the clinician implemented these procedures correctly, they found a reduction in

problem behaviors by the children (Laws, Brown, Epstein & Hocking, 1971). A paraprofessional learned to implement goals in a way that impacted the child's behavior in a positive way.

Martin and colleagues combined behavior analytic and occupational therapy goals into the same case study; they called it a multifaceted approach (Martin, Southall, Shea & Marr, 2008). The participant's biggest problem behavior, refusing to eat, improved significantly. This case study showed social significance as well. Her parents were able to seek out hobbies and the participant began engaging in more peer interactions (Martin, Southall, Shea & Marr, 2008). In this case study, the family and client were positively impacted due to collaboration.

Purpose

The purpose of the present study is to determine efficacy of implementing goals from multiple professions in treatment sessions with graduate clinicians from one of three programs: OT, SLP, and ABA. Intervention instructs clinicians to execute goals from the other two fields into their own treatment session and maintain their field's goals. The results of the current study will be a working protocol for merged treatment in an Interprofessional Autism Clinic.

We expect participants to present higher levels of goal implementation from their respective field as compared to the other two fields in baseline.

We anticipate participants to present higher levels of goal implementation from the other two fields and maintain the level of implementation of their field following intervention.

Method

Participants

Four first year graduate clinicians from James Madison University participated in this study. Researchers recruited students from the following masters programs: occupational therapy, speech language pathology and behavior analysis. Professors from each program nominated students for this study based on competence in prior classes, student interest and scheduling considerations.

Setting

This study was conducted in the interprofessional autism clinic (IPAC) at James Madison University. Observers coded during structured and unstructured times in the Sensory Motor Room (SMR), Speech Room (SR), Music Area (MA) and Kitchen Area (KA). The SMR is 9m by 5m and the room had a ball pit, swings, trampolines, foam stairs and other equipment typically used in an Occupational Therapy Session. Dimensions of the SR were 4m by 5m and the room contained a table, chairs and many types of toys which can be used at a table or on carpet.

Behaviors Observed

Techniques were selected from SLP, OT and ABA based on need of the clinic, common use in each field and evidence-base in the literature of each respective field. Goals from OT included exposure to sensory stimuli and prompting through sensory defensiveness.

sensory exposure. Participant presents different stimuli to the child in the session. This is scored when the clinician presents a new stimulus: vestibular, proprioceptive, and tactile can each be considered new in the interval. This is scored per

interval when one or more of these exposures occur. An exposure that occurred in the prior interval (flying through the air) that is repeated in the second interval (flying through the air again) can be counted in both intervals as new sensory exposure. Multiple exposures can happen in one interval (vestibular and proprioceptive, for example).

vestibular. Body position, balance and movement against gravity (Youngstram et al. 2002). This will be scored when the therapist introduces stimuli in which the child must engage in unlevel surfaces or needs to balance himself in a way other than standing up straight. For example, when the child must sit on something other than a stable chair and has to maintain an upright seated position. This will also be scored when the therapist presents stimuli in which the child's head position is different than sitting/standing upright in one position. Example: flipping upside down, flying through the air. Walking from one place to another is not scored, standing from a seated position/sitting from a standing position/and going to a laying down position is not scored.

proprioceptive. Awareness of body position and space (Youngstram et al., 2002). This is scored when the therapist provides an opportunity for the child to receive input to their joints. This could include activities such as jumping or bumping into things, rolling across the mat or firm hugs.

tactile. ability to register and discriminate touch sensations (Youngstram et al., 2002). This will be scored when the clinician presents a unique touch stimulus to the child's skin (*Wisconsin Indian head technical college occupational therapy assistant student handbook)* in the interval.

prompting through sensory defensiveness. Physical prompting from the clinician for the child to interact with the stimulus presented by the clinician. Two things are scored in this goal: Sensory defensiveness/avoidance and clinician prompting.

Sensory defensiveness/avoidance. is scored when the child engages in behaviors that create distance from the stimulus, turning away, verbal refusal, or distressed facial expressions when prompted to engage or currently engaging in an activity involving sensory input, including movement. It is scored if it continues from one interval into the next interval.

clinician prompting. is scored as full physical and partial physical prompting. This is counted when the child is initially resistant to the stimulus and the therapist intervenes by physically guiding the child. The sequence is still scored if the child is engaging. A proper sequence is: the child does not show resistance, the therapist does not offer a prompt. Another proper sequence is: the child is resistant, the clinician offers a full or partial prompt.

full prompt. is counted when the clinician is touching the body part of the student intended to interact with the stimulus throughout the entire process of the task. Example: the student is to engage in play with playdoh. The clinician physically guides the child's hand to engage in the playdoh the entire time.

partial prompt. is counted when the clinician is touching the child while moving toward the stimulus. This can be counted if there is an initial touch and then the touch to engage toward the stimulus and then it is released, or if there is initially not a touch but there is a touch to engage throughout any part of the task.

Goals from Speech Language Pathology included expansion of utterance and reinforcement following a communication outcome.

expansions of utterance. This is scored when the participant does either an expansion or reauditorization. If the clinician is in the middle of saying the expansion or reauditorization during an interval change, the behavior is scored in the interval in which the phrase is completed.

reauditorization. the clinician verbally echoes exactly what the child said adding nothing nor taking away any words.

expansion. the clinician verbally echoes what the child says and adds words to give additional meaning to the utterance.

access with communication outcome. This is scored when the clinician presents a reinforcer, either a verbal praise or the item being withheld, so that the student has tactile or auditory access to it in the presence of a communication response (verbally or receptively). This is scored in the interval in which the reinforcer being withheld is delivered. This is only counted when the reinforcer is delivered within 5 seconds of the child's communicative response.

Behavior Analysis techniques consisted of Demand Sequences and Differential Attention.

commands. Direct commands are declarative statements that contain an order or direction for a vocal or motor behavior to be performed and indicate that the child is to perform this behavior. Direct (and indirect) commands are always worded positively (Eyberg, 2010).

questions. Questions are verbal inquiries that are distinguishable from declarative statements by having a rising inflection at the end and/or by having the sentence structure

of a question. Questions request an answer but do not suggest that a behavior is to be performed by the child (Eyberg, 2010). For the purposes of this study, questions and commands with no opportunity to comply/answer that can be seen (example: "clap", 2 seconds, "Heather, look at me") will be scored, however demands with no visual behavior to follow (example: "Think about it") will not be scored as a sequence.

pause. This is scored when the clinician who gave the demand pauses for 5 seconds after the last word of the demand. This will be counted if the child complies or answers within that five seconds. The clinician also refrains from physically prompting the child during that five seconds.

no pause. This is scored when the person who gave the demand talks or physically prompts the child during the five seconds following the last word of the demand.

***differential attention.** This is scored when the clinicians delivers praise, labelled or unlabeled, or positive touch (Eyberg, 2010) when the child engages in or attempts to engage in a specified behavior (as listed below; Active Listening and Coordinated Joint Attention). If they are attending to the desired goal/behavior in one interval and that continues into the next interval it is counted in both intervals.

active listening. This is defined as answers to questions and compliance to commands.

coordinated joint attention. Is counted when the client engages in an uninterrupted three point gaze. He/she may look at a toy/object/item/activity to another person's face and back to the toy or he/she may look at another person's face, to the toy,

and back to another person's face. It is counted in the interval in which it is initiated (adapted from Lord, Rutter, DiLavore, Risi, 2012).

*This goal will be scored by observers who score SLP goals due to the complexity of the first ABA goal. That is why the data sheet for SLP includes differential attention and the data sheet for ABA does not.

Observers

Six psychology students coded observations. Observers were trained by coding practice sessions for up to fifteen weeks prior to the study. Observers coded live sessions and video recordings during training. They listened to a voice-recording stating intervals on an iPhone 5.

Procedures and Experimental Design

A concurrent multiple baseline across participants design was used in this study (Kazdin, 2010). Training was implemented sequentially across participants. Intervention included training graduate clinicians from one of the three fields, OT, SLP and ABA, to implement techniques specified by the other two fields. A student from OT received training on SLP and ABA goals, for example. Maintenance of their home field's goals in was also evaluated. Data were analyzed using visual analysis. Graphed data examined an individual's data before and after intervention. Change or stability of trend, level, variability, cycles and range was analyzed. This helps establish evidence for a functional relationship between the intervention and changes in participant behavior. Functional relationships are a crucial analysis in single case experimentation (Parsonson, 2003; Baer, Wolf & Risley 1968). A social validity questionnaire (see Appendix A) was given to participants at the conclusion of the study. Consistent with Wolf (1978) the questionnaire

addresses effectiveness, appropriateness and impact of goals, procedures and effects (Wolf, 1978).

Baseline. Participants were instructed, "do a treatment session as you normally would". Their sessions occurred in a room at IPAC which was conducive to acquiring their goals. Researchers gave no other instructions or feedback following the session. In these sessions there was a mix of structured and unstructured activities available. Researchers thanked participants but provide no other feedback.

Merge Treatment Training. Duration of training depended on how long it took participants to reach mastery criterion. The initial training session endured one hour for the first three participants. Training consisted of learning six techniques, two from two fields other than their own and review of the two techniques from their home field. For example, an OT clinician learned two goals from SLP and two goals from ABA and reviewed OT techniques. Before training, the researcher provided participant with an instructional worksheet by email (See Appendix A) explaining the goals. Once participants arrived at the initial training, researchers fielded any questions participants had about the document. Next, they offered examples of each goal. Researchers showed a YouTube video that lasted 90 seconds and verbally identified the goals throughout. After the video, researchers role-played the goals in a mock three-minute session. One researcher pretended to be a child and the other pretended to be a clinician. The participant observed the interaction and verbally identified goals. Then the participant rehearsed these skills through role-play with a researcher. This dyad was scored.

A mastery criterion was established by behavior observation of licensed professionals from each field implementing the goals. Implementation was scored in

percentage of intervals and initially ranged from 67-86% occurrence in intervals. After discussion of calculating data, researchers decided that one goal from each field was more accurately calculated as a response per opportunity measure. Percentage of interval measures included introduction of sensory stimuli, reinforcement for communication outcomes and differential attention. The response per opportunity goals included prompting through sensory defensiveness, expansion of utterance and demand sequencing. The adjustment transpired because the second category of goals are contingent on specific situations. For example, in the OT goal, in order for prompting to be necessary, the child needs to be sensory defensive. In order for expansion of utterance to occur, the child must say something in the interval. In order for a proper ABA demand sequence to happen the clincian needs to give a command or question. By calculating a percentage of intervals for these particular goals, researchers received an underestimation of proper implementation. Once adjusted, observation of the licensed professionals increased percentage correct and the mastery criterion was set at 85%.

When participants returned to the clinic, their sessions were structured with feedback before, during and after. Coaching and feedback are a continuation of the initial training and the sessions following the initial training are called probe sessions. Consistent with literature on performance feedback, researchers delivered corrective feedback prior to treatment sessions by showing the participant their own progress in graph form. Corrective feedback was delivered based on the lowest goal in the previous session. Researchers used bug-in-the-ear feedback preceding each probe session to provide guidance. The bug-in-the-ear system consisted of a headset worn by the participant and a microphone used by the coach. The coach stood in the same room as the

participant and delivered immediate feedback based on behavior observation of the participant. Content of bug-in-the-ear coaching consisted of prompting the participant to engage in the goals as well as verbal praise of the participant's use of those goals during the coaching session. This method allowed participants to receive immediate feedback in-vivo. The 10-minute probe session followed coaching. Once the session concluded, researchers delivered immediate, positive feedback based on performance. Feedback was related to the corrective feedback given prior to the independent.

For example, if the researcher gave the corrective feedback "In your last session you did introduction of stimuli at 50%. This was the skill you implemented least during your previous session. Our goal for this session is to increase that implementation" along with a strategy for how to increase implementation of that particular skill. Post-session feedback was related. For example, "In your last session you implemented 50% of introduction of stimuli and this time you increased your implementation to 65%. That is exactly what our goal was for this session. Excellent job" (Daniels & Daniels, pp. 177, 2006). Researchers instructed participants, "implement techniques you learned during training and continue treatment". Coaching sessions lasted 5-minutes followed by 10-minutes of data collection during which no coaching occurred. Time was allotted following the participant's session to ask questions. Participant had access to her own data in the form of percentage of implementation and graphs.

Results

The purpose of the present study was to evaluate the effectiveness of a training package on first year graduate clinicians in an interprofessional autism clinic. Four clinicians have undergone training. Baseline data points were taken for each clinician and

after four data points; researchers began the treatment package for Donna. In baseline, Donna's implementation of skills was clearly differentiated dependent on field. Both ABA goals were initially at a higher level than goals from OT and SLP. ABA Goal 1 was at a high level and slightly variable with a decreasing trend. ABA goal 2 was stable at a high level with no clear trend. All other goals, OT goals 1 and 2, and SLP goals 1 and 2 were at a low level. OT goal 1 and SLP goal 1 were slightly variable and had a slight increasing trend. SLP goal 2 had no clear trend and was stable. Due to the nature of OT goal 2 as a percent occurrence goal, only one data point was presented in baseline. Therefore, no information about trend or variability is available (See Figure 1). Leslie had stable, increasing trends for ABA goal 1, and both SLP goals at a mid level. ABA goal 2 was slightly variable at a mid level with a slightly increasing trend. OT goal 1 was slightly variable at a low level with no clear trend. OT goal 2 only had two data points in baseline and therefore, no information about trend or variability is available. However, it was at a low level. April presented low levels of ABA goal 1, both SLP goals and OT goal 1. OT goal 1 had an increasing trend and was variable. OT goal 2 had an increasing trend and was stable at a mid level. ABA goal 1 was stable with no trend. SLP goals were slightly variable with slight increasing trends. ABA goal 2 was variable at a mid level with a decreasing trend. Ann demonstrated higher levels of her home field's goals as compared with the other fields. In baseline, ABA goal 1 was slightly variable at a mid level with no clear trend. ABA goal 2 was variable at a high level with a decreasing trend. There were only two data points in baseline for OT goal 2 and they were both at 0. OT goal 1 and SLP goal 1 were variable at a low level with slight increasing trends. SLP goal 2 was stable at a mid level with a clear increasing trend. During training, the first

three participants met mastery for of 85% of implementation of goals for the new goals after three role-play sessions and the fourth participant met mastery after two role-plays. Criteria was considered attained if implementation of their home field's goals were comparable to pre-training levels.

Following intervention, coaching preceded probe sessions. Coaching lasted five minutes and (M = 30) phrases were used per coaching session. Data were collected on phrases used in coaching to explore coaching content in this treatment package. Phrases were categorized by prompts, praising and comments. Praising was used most often (M = 15), prompts were second most often (M = 13), and comments were least used (M = 2).

During probe sessions, changes were immediately evident. For Donna, OT Goal 1 had the most profound change from pre-intervention (M = 6%) to post-intervention (M = 81%) and other goals showed abrupt changes in average implementation as well (See Figure 3). ABA Goal 2 was higher in pre-training (M = 90%) and than in probe sessions (M = 82%). All goals had an immediate change in increased level except OT Goal 2 and ABA Goal 2. OT Goal 2 decreased initially then promptly increased to 100% implementation. There was no level change for ABA Goal 2. SLP Goal 1 was at a mid level and ABA Goal 1 was at a high level. Training positively impacted Donna's executing her own field's goals. Donna implemented ABA goal 1 at a lower level (range 40-78%) than ABA goal 2 (range 84-94%) prior to intervention and in probe sessions ABA goal 1 was at a comparable level (range 73-93%) to ABA goal 2 (range 70-94%).

For Leslie, OT Goal 1 had the most profound change from pre-intervention (M = 5%) to probe sessions (M = 54%) and other goals showed prompt changes in average implementation as well (See Figure 3). Although ABA goal 1 had an increasing trend in

baseline, there was a clear level change in probe sessions. In baseline, the range in baseline was 20-48% whereas the range in probe sessions was 59-80%. ABA goal 2 had a similar increasing trend in baseline and a change in level in probe sessions. It was implemented at a high level was slightly variable with no clear trend. Range of implementation in baseline was 19-58% whereas in probe sessions it was 71-90%. Both SLP goals were stable at a mid level with a slight decreased level. They were lower than the implementation of the other goals.

April exhibited the largest change in implementation of ABA goal 1 from baseline (M = 0%) to probe sessions (M = 65%). SLP goal 2 also showed a significant change in average implementation from baseline (M = 6%) to probe sessions (M = 39%). ABA goal 2 showed a slight increase in level and a less variability from baseline (33-100%) to intervention (55-93%). OT goal 1was stable with an increasing trend at a mid level. A slight change in level was noted for SLP goal 1. SLP goal 1 was variable with an increasing trend. ABA goal 1 was variable at a high level with an increasing trend. SLP goal 2 was stable at a mid level with no clear trend.

After intervention, Ann implemented OT goal 1 had the most profound change from baseline (M = 15%) to intervention (M = 78%). OT goal 1 was stable at a high level with a decreasing trend. Means for SLP goal 1 and 2 also had evident increases in implementation (see figure 3). SLP goal 1 had two overlapping data points as compared with baseline, but the final data point was at a high level. SLP goal 2 continued the increasing trend, was at a mid level and was stable. Mean implementation for ABA goal 1 increased. It was variable at a mid level with a slight increasing trend. The mean for

ABA goal 2 was the same before and after intervention. This goal was variable at a high level with an increasing trend.

This study is situated in an already existing training program for OT, SLP and ABA students. An unintended finding for the effectiveness of the clinic as a training program for first year graduate students in their first semester at the clinic was discovered (See Figure 2). For April and Leslie, there is a distinctive increasing trend in their own field's skills over time prior to intervention. Donna and Ann were in their second semester in the clinic and presented with high and mid levels of their own field's goals.

Interobserver agreement was calculated on 27% of observations. For each goal, there was at least 87% agreement (SLP Goal 1 = 87%, range 62-100%; SLP Goal 2 = 86%, range 73-94%; OT Goal 1 = 92%, range 68-100%; OT Goal 2 = 97%, range .88-100%; ABA Goal 1 = 85%, range 75-100%; ABA Goal 2 = 90%, range 74-98%) which is an adequate level of agreement. Therefore, the integrity of the definitions among different observers is intact. IOA was calculated point by point per interval per goal for occurrence and non-occurrence of goals. This method of IOA was selected due to the difference in occurrences of goals per participant. Certain participants implemented at a higher occurrence and some at a lower occurrence. In order to get an appropriate and comparable depiction of reliability both occurrence and non-occurrence reliability was necessary.

Discussion

The current study trained four, first year graduate clinicians from OT, SLP and ABA graduate programs on techniques from two fields other than their home field into their own, supervised treatment session. There was a distinctive, positive change in

implementation of skills immediately following training for participants. An unintended finding of home field learning was discovered in this study, particularly for students who were in their first semester in the clinic. Coaching content was explored during probe sessions. Phrases were categorized and scored as praise, prompts and comments. Praise was the most often used followed by prompts and comments.

There has been a call for merged treatment procedures (Akerson, Hammond, Hargens, O'Donoghue, Stanford, Stewart & Stokes, 2013) and for training protocols for paraprofessionals who work with children with special needs (Smith, 1990). The current study aimed to address both of these. OT, SLP and ABA are recognized therapies for ASD and are recommended by several organizations (Center for Disease Control, 2013; National Autistic Society, 2012). Specific targets within these therapies are imperative for treating core deficits of autism. As such, effective programs include these targets and treatment merging these fields could enhance treatment for ASD (American Psychological Association, 2013; National Research Council, 2001). This protocol may act as a good step in developing effective and comprehensive training for clincians who work with children with ASD.

A working protocol was developed based on the needs of the interprofessional autism clinic and the push for interprofessional education at JMU (Akerson, Hammond, Hargens, O'Donoghue, Stanford, Stewart & Stokes, 2013**).** Selection of skills for training therapists was based on previous literature. Clinicians were taught skills frequently used by licensed therapists from the three fields, as indicated by metaanlyses and commonly used texts (Parham, Cohn, Spitzer, Koomar, Miller, Burke, Brett-Green, Mailloux, May-

Benson, Roley, Schaaf, Schoen & Summers, 2007; Gladfelter, Wendt & Subramanian, n.d.; Cooper, 2007).

Many studies in prior literature indicate the implications of certain procedures on the child, but infrequently evaluate clinician implementation (Martin, Southall, Shea & Marr, 2008; Barrett, Dadds & Rappe, 1996; Russo, Cataldo & Cushing, 1981). There has been growth of evaluating efficacy of treatment, particularly in paraprofessionals executing skills outside their home field. Such studies demonstrate the ability for individuals from different fields to enhance their repertoire with expert input and coaching (Bethune & Wood, 2013; Laws, Brown, Epstein & Hocking, 1971). There has been evidence for positive sentiments of merged treatments compared with typical practice, which is more serial in nature. These evaluations of merged protocols was indicated by clients (Cup, Pieterse, Knuijt, Hendricks, van Engelen, Oostendorp & van der Wilt, 2007) and professionals intricately involved in treatment (Körner, 2010). Methods for these studies involved participant self-report and not direct observation. Training procedures for the current study were derived from reputable training literature, which suggests an outlined protocol: corrective feedback, coaching with immediacy of feedback, individual session without coaching, positive feedback procedure (Daniels & Daniels, 2004). The present study furthered previous literature by training graduate students acting as paraprofessionals on evidence based skills and evaluating clinician implementation. This merged protocol was evaluated with direct behavior observation, input from experts and coaching.

Giangreco et. al indicate the need for innovative treatment by professionals who are well informed and educated in order to most effectively address the needs of the

client (Giangreco, Edelman, Broer & Doyle, 2001). This study was innovative in its interprofessional approach, but the child did not continually receive treatment from the most experienced professional. Instead, during this study, the child received treatment from supervised, first year graduate students who are developing their own field's repertoire as well as new skills taught in training.

A minor limitation of different clinician familiarity with the clinic could have occurred. The ABA students had been involved in the clinic for one semester prior to the study and the OT and SLP studnets were just beginning their first semester in the clinic. Due to the interprofessional and collaborative nature of the clinic, graduate student participants were observing other professionals and students from the other fields throughout the study. As well, there were interprofessional meetings with exchange of ideas and techniques for treatment. Clinicians were diligent in taking notes during these meetings and asked follow up questions based on a techqniue novel to them. This could have created a confound to training.

During the project, the speech task itself changed half way through this study. Initially the task was an expressive task. Clinicians and the SLP at the clinic changed the task due to the needs of the child. In the results, it appears that the SLP student's goal implementation of SLP goals is decreasing, when in fact the student was balancing the needs of the child and the training. The two things interfered with each other. That could be a contributing factor to the seen decrease in SLP goal 1. Also, SLP goal 1 was consistently a struggle for participants across the board. Students were consistently implementing this goal lowest. However, in their sessions they were doing receptive tasks

which are speech related. Future research should be more comprehensive for receptive tasks while scoring speech goals.

The training procedure should also be discussed more thoroughly. A graduate student from the ABA program was the main trainer and coach for this study. Even with consultation with the licensed professionals from the three fields, a student who is still developing the repertoire themself may be a less effective trainer than a licensed professional with more experience. Training was slightly different depending on the participant. Emphasis on skills other than their home field was necessary for acquisition of those skills. However, all six goals were covered in training, regardless of levels during basline data. Student participants commented on the complexity of the merge of these goals and some stated they did not think it was possible. These comments occurred at the beginning of the role play sessions and participants appeared overwhelmed. However, after the second trial, participants appeared motivated to continue, and spontaneously evaluated their own implementation. The OT and Leslies had difficulty meeting the designated mastery criteria for their home field's goals. However, they were maintaining levels that they were presenting in baseline. Therefore, mastery criterion should have been more flexible and adaptive based on baseline data.

In probe sessions, many of the participants asked for their exact percentages of implementation and would seek out specific strategies to increase their implementation. They approached the trainer and people from other fields at the clinic. Also, students appeared to be more creative in their treatment sessions and asked to move to another rooms, developed unique materials and new lessons for their students. In many other

ways, probe sessions were qualitatively different. Future data should investigate this aspect of merged protocols more systematically.

ABA student and Leslie's probe sessions looked very similar. Students used similar techniques and activities during their sessions even though to the researcher's knowledge, collaboration between the two clinicians did not occur. This is a qualitative dimension of a merged protocol. Systematic evaluation of the structure and activities of sessions before and after intervention could be an interesting component of future study. An onlooker may find it challenging to determin which home field the clinicians are from.

This study did not determine which component of treatment was effective or if every aspect of the package was necessary. Conclusions can only be made about the training package as a whole: training session and coaching in post-treament session. Further, conclusions can only be made about changes that involve sessions with coaching. Due to time constraints, an appropriate fading procedure for coaching was not used. It would be advantageous for clinicians to execute skills without the presence of a coaching session prior to probe sessions. In doing so, an investigator could draw conclusions about the durability of the treatment package, how long coaching was necessary and at what point of mastery participants maintain skills without coaching.

Experimental control was evident through the introduction of training in Donna and an immediate change in that participant's behavior in tandem with a lack of change in other participants' behavior who were still in baseline. This indicates that the training package had an immediate change and it is less likely due to the passage of time. Arguments could be made that inhibit experimental control due to the learning curve

discovered in April and Leslie's. However, this study does not suggest a lack of learning in the participant's own field. Instead, over time one would anticipate such an increase in their own field and a lack of an increase in other fields. Generally this was the case. Therefore, our expectation for students implementing their home field's goals at a higher level was seen only in students who had one semester in the clinic already. And, a pattern of learning was discovered for students who were experiencing the clinic for the first time.

ABA goals and SLP goals may have not been mutually exclusive; observers could have scored the same behavior as an ABA goal and an SLP goal because of the extensive overlap. Examples of this include the ABA goal differential attention and the SLP goal reinforcement for communication outcome. Throughout the study, it was possible for the observers to score both behaviors in one instance. The data paths for these two goals followed each other on numerous ocasions in the graphs. In future studies, these definitions should be refined to be mutually exclusive. This could require scoring rules that are heriarchical or more exclusion criteria in the definitions. However, it would be advantageous for a clinician to execute the same activity and hit many goals at once to remain efficient. It is not the goal of collaborative practice to add many more techniques and to exclude ones own field goals. Instead, a clinician should be able to creatively integrate skills in a way that they can maintain their own goals while tweaking their treatment to be inclusive of the comprehensive treatment plan.

The present study did not evaluate child outcomes as a result of clinician behavior change. This would be essential for claiming the effectiveness of this treatment for children with ASD. Future investigators should assess child outcomes alongside clinician

behavior change. One participant commented that the child was more engaged in activities and presented fewer avoidance behaviors. This would be an interesting topic for future study. A study comparing two groups of clinicians and children, one with serial treatment and the second with collaborative treatment would be an interesting evaluation. Investigators could control for the passage of time using multiple baseline designs across clinicians and children. A reversal design introducing and retracting the collaborative approach could also control for this.

The present study did not evaluate generalization for other locations. One participant indicated their use of the skills taught in this training being used in other locations with other students. She suggested studying generalization to other areas as a future course for investigations. One student indicated this study's importance for clinicians and said that everyone involved should have gone through this!

The current investigation utilized ABA students as coaches and observers. Future studies should be more collaborative in the research process. Incorporating other disciplines into the data collection and coaching processes would be beneficial. After collaborating with the licensed SLP, the coach of the current study was more informed about ways to encourage SLP goal implementation in a more effective way.

In conclusion, this study determined an effective training package for first year graduate students from OT, SLP and ABA programs at JMU in the first and second semseter of clinic experience. In training, participants met mastery of 85% of all six skills and showed a prompt change of these skills in post-intervention sessions with coaching.

*Figure 1. Percentage of Skill Implementation per Clinician***.** Arrows indicate the home field of the participant. Probe sessions are a continuation of the initial training. Coaching occurred for five minutes before probe sessions.

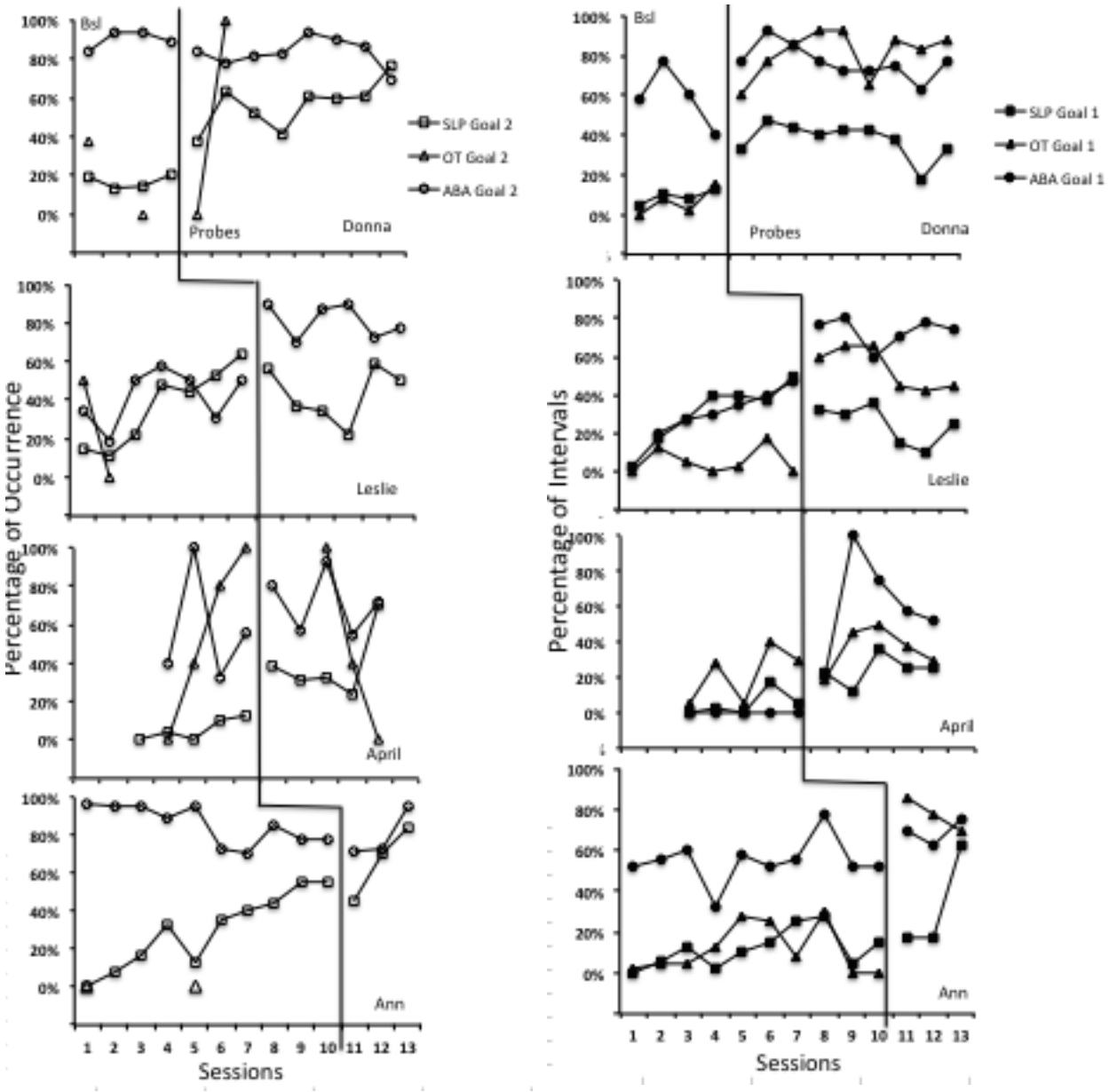


Figure 2. Percentage of Skill Implementation per Clinician's Field

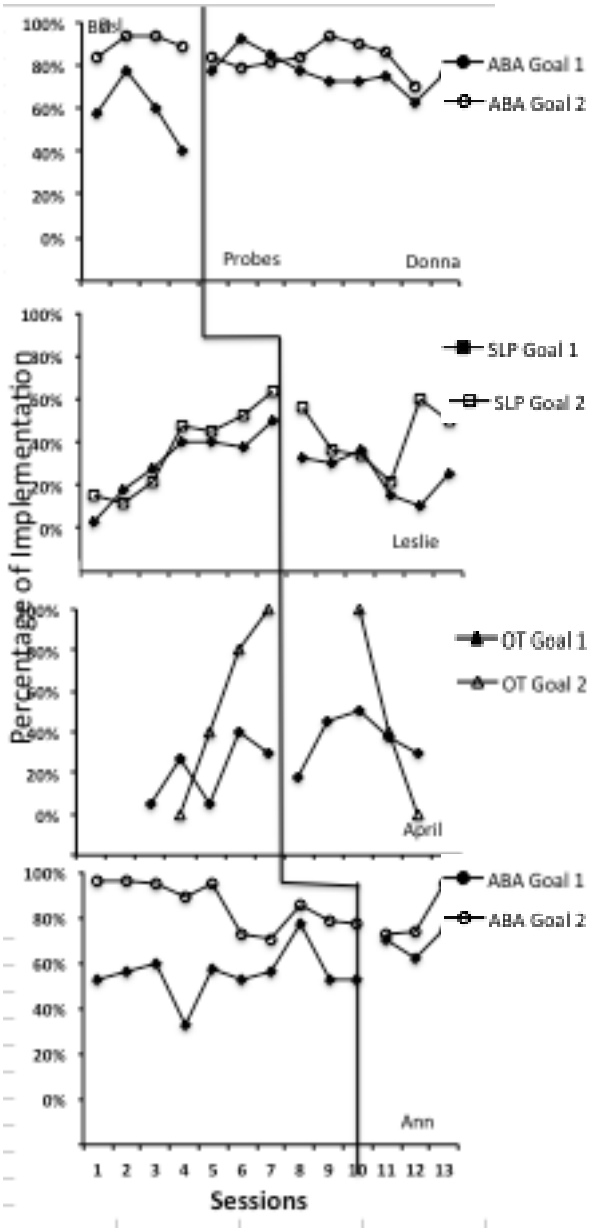


Figure 3. Average skill implementation per clinician across skill set.

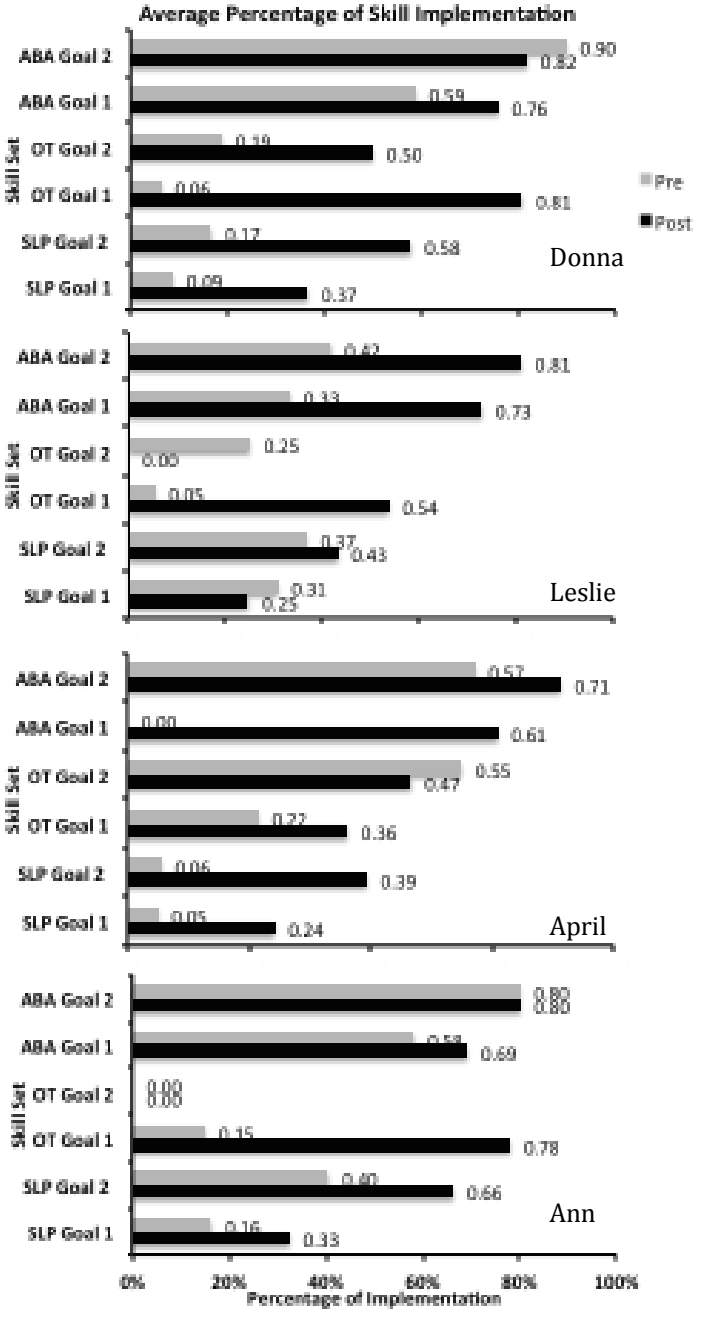
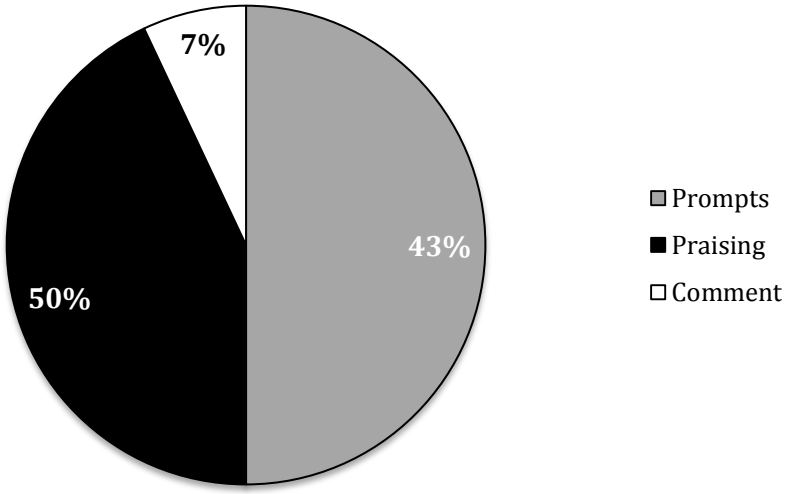


Figure 4. Average amount of coaching content: categories of phrases used.



Appendix A: Data Forms

Occupational Therapy Data Forms.

Date: Observer #: Participant #: Condition: Baseline Treatment IOA: Yes No

Minute	**1**				**2**				**3**				**4**				**5**				**6**				**7**				**8**				**9**				**10**			
Interval	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Tactile																																								
Proprio																																								
Vestibular																																								
Resistance																																								
Full																																								
Partial																																								

Date: Observer #: Participant #: Condition: Baseline Treatment IOA: Yes No

Minute	**1**				**2**				**3**				**4**				**5**				**6**				**7**				**8**				**9**				**10**			
Interval	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Tactile																																								
Proprio																																								
Vestibular																																								
Resistance																																								
Full																																								
Partial																																								

Speech Language Pathology Data Forms.

Date: Observer #: Participant #: Condition: Baseline Treatment IOA: Yes No

Minute	**1**				**2**				**3**				**4**				**5**				**6**				**7**				**8**				**9**				**10**			
Interval	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Reinf. For Com.	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	i
Expan. Of Utternaces																																								

Date: Observer #: Participant #: Condition: Baseline Treatment IOA: Yes No

Minute	**1**				**2**				**3**				**4**				**5**				**6**				**7**				**8**				**9**				**10**			
Interval	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Reinf. For Com.	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	i
Expan. Of Utternaces																																								
Diff. Attention																																								

Applied Behavior Analysis Data Forms.

Date: Observer #: Participant #: Condition: Baseline Treatment IOA: Yes No

Minute	**1**				**2**				**3**				**4**				**5**				**6**				**7**				**8**				**9**				**10**			
Interval	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Question																																								
Command																																								
Answer																																								
No Answer																																								
Compliance																																								
NC																																								
Pause																																								
No Pause																																								

Date: Observer #: Participant #: Condition: Baseline Treatment IOA: Yes No

Minute	**1**				**2**				**3**				**4**				**5**				**6**				**7**				**8**				**9**				**10**			
Interval	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Question																																								
Command																																								
Answer																																								
No Answer																																								
Compliance																																								
NC																																								
Pause																																								
No Pause																																								

Appendix B: Training Document

Premise of this Training: There are 6 goals we will focus on in this training that are used at IPAC: 2 goals from Occupational Therapy, 2 goals from Speech and 2 goals from Applied Behavior Analysis. We will merge these in your sessions following this training. Please read the following 6 goals (two of which you are likely familiar with from your particular field) and write down any questions you may have. Training will ensure you feel comfortable implementing these goals before your next session with our IPAC client!

Throughout Session Goals:

1. OT- Sensory Exposure: Presenting new stimuli more often and presenting a variety of different stimuli relating to different senses.

Vestibular Stimuli – Balance. Anything that will make the student interact in unlevel surfaces. Changes in head movement through space also.

Examples: Flying through the air, flipping, jumping.

Proprioceptive – putting pressure on the student's joints.

2. SLP- Access following a communication outcome: The clinicians delivers a reinforcer (detailed below) only after the child responds verbally or nonverbally to a question, direction or activity involving a specified speech goal (below).

Reinforcers: Items the child likes or gravitates toward.

Verbal approval- ie"great job", "awesome!"

Positive touch- ie high fives, pat on the back.

Communication outcomes: Verbal or nonverbal responses to questions or activities involving

Preopositions- on, under, on top, in between, in, beside

Pronouns- he, she, they

Ownership- hers, his, theirs

Example: Clinician:"Put the red block in between the squares"

Child puts the block in between.

Clinician: "Wonderful!"

3. ABA- Differential Attention: The clinician delivers a reinforcer (described above) when the child complies/attempts comply to commands or answers/attempts to answer questions. Reinforcers are also deliverd if the child attends to the same activity as the clinician with joint attention (defined below). Also, the clinician withholds reinforcers when the child is non-compliant and doesn't answer questions.

Joint Attention- an uninterrupted 3-point gaze.

Example: child looks at an object, looks at the clinician then back at the object without looking at other things or people during this gaze.

If...then Goals:

1. OT- Prompt Through Sensory Defensiveness: When a stimulus is presented to the child and the child is resistant to interacting with the stimulus (defined below), the clinicians is to wait five seconds to allow the child to engage with the stimulus. If the child does not engage, the clinicians is to prompt the child to engage. *If the child is resistant, then the clinician prompts him.*

Sensory Defensiveness- when the child engages in behaviors that create distance from the stimulus, turning away, verbal refusal, or distressed facial expressions when prompted to engage or currently engaging in an activity involving sensory input, including movement.

Prompting- the clinician touches the body part of the child that is intended to interact with the stimulus.

2. SLP- Expansion of Utterance: When the child talks, the clinician repeats back what the client says and/or expands on that phrase or word to give him a model. This hopefully will increase his language use. *If the child talks, then the clinician repeats or expands what he said.*

Reauditorization: Saying exactly what the client says- adding nothing to it nor taking anything away.

Expansion: Saying what the client says and adding additional words to it to enhance the meaning.

3. ABA- Opportunity to Comply: When the clinican gives a direction or asks a question, the clinician waits 5 seconds (not talking nor touching the client). This allows the client to process the demand and appropriately respond. *If the clinician asks a question or gives a command, then he/she waits 5 seconds.*

Appendix C: Social validity Quesionnaire

Appropriateness of Procedures

Name_____ Date: _____

Questions for Participants to Answer	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree
Appropriateness of Procedures	5	4	3	2	1
1. The written materials were easy to read and understand.					
2. My coach understood and communicated procedures and techniques effectively.					
Social Significance of Goals	5	4	3	2	1
4. I would recommend a similar training to other practicum students.					
5. It is important to learn techniques such as these to teach children new skills.					
Social Importance of the Effects	5	4	3	2	1
6. I learned many beneficial skills during this training.					
7. I would like the opportunity to use these skills to assist in therapeutic activities.					

Appendix D: Consent Form

Consent to Participate in Research

Training Graduate Clinicians to Implement Occupational Therapy, Speech Language Pathology and Applied Behavior Analysis Goals in Their Treatment Session Supervised by Licensed Clinicians

Principal Investigator: Heather White
whitehb@jmu.edu

Identification of Investigators & Purpose of Study

You are being asked to participate in a research study conducted by Heather White and faculty from James Madison University. The purpose of this study is to investigate different methods of training in the implementation of goals from multiple fields to determine which methods are most effective in yielding desirable outcomes. This study will contribute to the researcher's completion of her master's thesis.

Research Procedures

Should you decide to participate in this research study, you will be asked to sign this consent form once all your questions have been answered to your satisfaction. This study consists of reviewing goals and procedures from other fields. All materials and training will be provided as part of the activities of the Inter-Professional Autism Clinic (IPAC). After reviewing the training materials, you will participate in role-playing of procedures with other graduate students before working toward a level of performance considered good practice by the licensed supervising therapists. After you have reached a comfortable level of practice, you will be asked to perform goals with a child in the clinic. While working with this client, you will be receiving prompt feedback after your session. You will be able to review your performance at the end of each session.

Time Required

Participation in this study will require about 2 to 3 hours of your time per week for approximately 8 to 20 weeks.

Risks

The investigator perceives that this research involves no more than minimal risk. The following are possible risks arising from your involvement in this study:

- You may be uncomfortable with direct observation in the beginning of the study, although previous research has shown that such discomforts are usually temporary.
- There is a small risk of interacting with a child who exhibits aggressive behavior that may result in a minor injury from a hit, bite or scratch. The investigative team will do their best to have participants work with children who have very little or no history of aggressive behavior. If there is unpredictable problem behavior, people on the investigative team have been trained to deal with this quickly and will step in to manage the situation. These risks are no greater than the rinks involved in your practicum activities.

Benefits

The main potential benefit from participation in this study is to improve your skills in therapeutic interaction with young children on the autism spectrum. The research will also help JMU develop collaborative goals for IPAC to develop a protocol that is most effective in delivering intensive and high quality services to children with autism and their families.

Confidentiality

The results of this research will be presented at the investigator's thesis committee meeting in which the thesis will be defended, and will be presented at the Psychological Sciences Symposium. The research may be presented and published at academic conferences and journals. The results of this project will be coded in such a way that the participant's identity will not be identified. All data will be stored in a secure location without names attached and accessible only to the research team members.

Participation & Withdrawal

Your participation is entirely voluntary. You are free to choose not to participate. Should you choose to participate, you can withdraw at any time without consequences of any kind. Your practicum placement and training at the Inter-Professional Autism Clinic will not be affected by whether you agree or decline to participate in this research.

Questions about the Study

If you have questions or concerns during the time of your participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact:

Heather White
Psychological Sciences
James Madison University
whitehb@jmu.edu

Trevor Stokes
Baird Center
James Madison University
Telephone: (540) 568-8829
stokestf@jmu.edu

Questions about Your Rights as a Research Subject

Dr. David Cockley
Chair, Institutional Review Board

James Madison University
(540) 568-2834
cocklede@jmu.edu

Giving of Consent

I have read this consent form and I understand what is being requested of me as a participant in this study. I freely consent to participate. I have been given satisfactory answers to my questions. The investigator provided me with a copy of this form. I certify that I am at least 18 years of age

._____
Name of Participant (Printed)

_____ _____
Name of Participant (Signed) Date

_____ _____
Name of Researcher (Signed) Date

References

Akerson, E., Hammond, J., Hargens, T., O'Donoghue, C., Sanford, J., Stewart, A., & Stokes, T. (2013). *White paper: the state of interprofessional education (ipe) in the college of health and behavioral studies*. Unpublished document, Interprofessional Education Taskforce, James Madison University, Harrisonburg, VA

American Occupational Therapy Association. (2004). Definition of occupational therapy practice for the AOTA Model Practice Act. (Available from the State Affairs Group, American Occupational Therapy Association, PO Box 31220, Bethesda, MD 20824-1220. E-mail: stpd@aota.org)

American Occupational Therapy Association. (2008). Occupational therapy practice framework: Domain and process. *American Journal of Occupational Therapy*, *62*, 625-683.

American Occupational Therapy Association. (2009). Scope of practice. Commission on Practice 2009 (Ed.), *The reference manual of the official documents of the american occupational therapy association, Inc.*. Retrieved from http://www.aota.org/~/media/Corporate/Files/Practice/OTAs/ScopeandStandards/Scope of Practice edited 2009.ashx

American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition,* Arlington, VA: American Psychiatric Association.

American Speech-Language-Hearing Association. (2006). *Roles and responsibilities of speech-language pathologists in diagnosis, assessment, and treatment of autism spectrum disorders across the life span* [Position Statement] Available from www.asha.org/policy

American Speech-Language-Hearing Association. (2007). *Scope of practice in speech-language pathology* [Scope of Practice]. Available from http://www.asha.org/policy/SP2007-00283/

Auster, E. R., Feeney-Kettler, K. A., & Kratochwill, T. R. (2006). Conjoint behavioral consultation: Application to the school-based treatment of anxiety disorders. *Education and Treatment of Children*,*29*(2), 243-256. Retrieved from http://ehis.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=6e9e1f76-b2cc-4670-912a-83d00f458b5e@sessionmgr115&vid=2&hid=17

Baer, D.M.., Wolf, M.M. & Risley, T.R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis*, *1*, 91-97. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1310980/pdf/jaba00083-0089.pdf

Baird Center. (2013, June). *Jmu autism center*. Retrieved from http://bairdcenter.cisat.jmu.edu/autism.html

Barrett, P M., Dadds, M. R., & Rapee, R. M. (1996). Family treatment of childhood anxiety: A controlled trial. *Journal of Consulting and Clinical Psychology, 64,* 333-342.

Bethune, K. S., & Wood, C. L. (2013). Effects of Coaching on Teachers' Use of Function-Based Interventions for Students With Severe Disabilities. *Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children*, *36*(2), 97-114. doi:10.1177/0888406413478637

Behavior Analysis Certification Board. (2010, July).*Guidelines for responsible conduct for behavior analysts*. Retrieved from

http://www.bacb.com/Downloadfiles/BACBguidelines/BACB_Conduct_Guidelines.pdf

California Department of Insurance. (n.d.). *Aba therapy is nationally accepted and approved*. Retrieved from http://www.insurance.ca.gov/0100-consumers/0070-health-issues/upload/ABATherapyExhibitA.pdf

Campbell, P. (1987). The integrated programming team: An approach for coordinating professionals of various disciplines in programs with severe and multiple handicaps. *Journal of the Association for Persons with Severe Handicaps*, *12*(2), 107-116. Retrieved from: http://fdc.webster.edu/wcr/education/SPED5312WE/SPED5312readings/Campbell.PDF

Case-Smith, J., & Bryan, T. (1999). The effects of occupational therapy with sensory integration emphasis on pre-school children with autism. *American Journal of Occupational Therapy*, *53*(5), 489-497. Retrieved from http://ajot.aotapress.net/content/53/5/489.full.pdf

Center for Disease Control. (2013, June 27). *Autism spectrum disorders (asds): Treatment*. Retrieved from: http://www.cdc.gov/ncbddd/autism/treatment.html

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis*. (2nd ed.). Upper Saddle River, NJ: Pearson/Merrill-Prentice Hall.

Cup, E., Pieterse, A., Knuijt, S., Hendricks, H. T., van Engelen, B. G., Oostendorp, R. A., & van der Wilt , G. J. (2007). Referral of patients with neuromuscular disease to occupational therapy, physical therapy and speech therapy: usual practice versus multidisciplinary advice. *Disability Rehabilitation*, *29*(9), 717-726. Retrieved from: http://www.ncbi.nlm.nih.gov/pubmed/17453993

Daniels, A., & Daniels, J. E. (2004). *Performance management: Changing behavior that drives organizational effectiveness* . (4 ed.). Performance Management Publication.

Dodd, B. (2007). Evidence-based practice and speech- language pathology: Strengths, weaknesses, opportunities and threats. *Folia Phoniatrica et Logopaedica*, *59*, 118-129. doi: 10.1159/000101770, http://www.karger.com/Article/Pdf/101770

Dubouloz, C. J., Egan, M., Vallerand , J., & von Zweck, C. (1999). Occupational therapists' perceptions of evidence-based practice. *American Journal of Occupational Therapy*, *53*(5), 445-453. Retrieved from http://ajot.aotapress.net/content/53/5/445.full.pdf+html

Dysart, A. M., & Tomlin, G. (2002). Factors related to evidence-based practice among u.s. occupational therapy clinicians. *American Journal of Occupational Therapy*, *56*(3), 275-284. Retrieved from http://ajot.aotapress.net/content/56/3/275.full.pdf

Eyberg, S. (2010). *Abridged manual for the dyadic parent-child interaction coding system, 3rd ed.* Prepared by the Child Study Lab, University of Florida.

Eyberg, S. M., Nelson, M. M., & Boggs, S. R. (2008). Evidence-based psychosocial treatments for children and adolescents with disruptive behavior. *Journal of Clinical Child and Adolescent Psychology*, *37*(1), 215-237. doi: 10.1080/15374410701820117

Fuchs, L.S., Fuchs, D., Hamlett, C.L & Stecker, P.M. (1991). Effects of Curriculum Based Measurement and Consultation on Teacher Planning and Student Achievement in Mathematics Operations. *American*

Educational Research Journal. 28(3), 617-641. Retreived from: http://aer.sagepub.com/content/28/3/617.full.pdf+html

Giangreco, M. F., Edelman, S. W., Broer, S. M., & Doyle, M. B. (2001). Paraprofessional support of students with disabilities: literature from the past decade. *Exceptional Children*, *68*(1), 45-63. Retrieved from http://eric.ed.gov/?id=EJ632593

Giller, A.G. (2011). *The effects of differential attention on the cooperative behaviour of preschool children* (Thesis). University of Canterbury, New Zealand. Retrieved from:http://ir.canterbury.ac.nz/bitstream/10092/6432/1/Masterscompletedocument PDFJacquiGiller.pdf

Girardeau, F. L., & Spradlin , J. E. (1970). *A functional analysis approach to speech and language*. (Vol. 14, pp. 1-8). Retrieved from http://www.asha.org/uploadedFiles/publications/archive/Monographs14.pdf

Girolametto, L., Weitzmen, E., & Greenberg, J. (2003). Training day care staff to facilitate children's language. *American Journal of Speech-Language Pathology*, *12*, 299-311. doi: 1058-0360/03/1203-0299

Gladfelter, A., Wendt, O., Subramanian, A., (n.d.) *Evidence-based speech and language intervention techniques for the birth-to-three population*. (Thesis). Purdue University, West Lafayette, Indiana. Retreived from: http://www.cfs.purdue.edu/ITSI/docs/asubramanian.pdf

Hyman, S. (2013, June 4). New dsm-5 includes changes to autism criteria. *The Official Newsmagazine of the American Academy of Pediatrics*, Retrieved from http://aapnews.aappublications.org/content/early/2013/06/04/aapnews.20130604-1.full.pdf

Kazdin, A. (2011). *Single-case research designs: Methods for clinical and applied settings*. (2 ed.). New York, NY: Oxford University Press.

Koegel, R. L., O'Dell, M., & Dunlap, G. (1988). Producing speech use in nonverbal autistic children by reinforcing attempts. *Journal of Autism and Developmental Disorder*, *18*(4), 525-538. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/3215880

Korner, M. (2010). Interprofessional teamwork in medical rehabilitation: a comparison of multidisciplinary and interdisciplinary team approach. *Clinical Rehabilitation*, *24*, 745–755. Retrieved from http://ehis.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=15420bcb-30f4-40b8-abcd-e00f540280b5@sessionmgr110&vid=2&hid=115

Laws, R. D., Brown, R. A., Epstein, J., & Hocking, N. (1971). Reduction of inappropriate social behavior in disturbed children by an untrained paraprofessional therapist. *Behavior Therapy*, *2*(4), 519–533. doi: http://dx.doi.org/10.1016/S0005-7894(71)80098-9

Lovaas, O.I. (1987). Behavior treatment and normal educational and intellectual functioning in young autistic children. *Journal of Consulting and Clinical Psychology*, *55*, 3-9. Retrieved from http://homepage.psy.utexas.edu/HomePage/Class/Psy394Q/Research Design Class/Assigned Readings/Validity Lecture/Lovass87.pdf

Lord C., Rutter, M., DiLavore, P.C., Risi, S. (2012). Autism diagnostic observation schedule (Ados-2). Los Angeles, California: Western Psychological Association.

Martin, C., Southall, A., Shea, E., & Marr, A. (2008). The importance of a

multifaceted approach in the assessment and treatment of childhood feeding disorders. *Clinical Case Studies*, *7*(2), 79-99. Retrieved from http://ccs.sagepub.com/content/7/2/79.full.pdf

Martini, R., Metthe, L., Savard, J., Duboluoz, C., & Klaiman, D. (n.d.). *Facilitating interprofessional collaboration among those who provide services to children with disabilities in the community*. University of Ottawa. Retrieved from www.caot.ca/powerpoint/Facilitating interprofessional.ppt

Meriam-Webster. (2013). *Collaborate*. Retrieved from http://www.merriam-webster.com/dictionary/collaboration

National Autistic Society. (2012, July). *National autism plan for children*. Retrieved from http://www.autism.org.uk/about-autism/our-publications/reports/other-reports/the-national-autism-plan-for-children.aspx

National Conference of State Legislation. (2012, August).*Insurance coverage for autism*. Retrieved from http://www.ncsl.org/research/health/autism-and-insurance-coverage-state-laws.aspx

National Research Council (2001) *Educating Children with Autism*. Committee on Educational Interventions for Children with Autism. Catherine Lord and James P.McGee, eds. Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

Ozonoff, S., Goodlin-Jones, B. L., & Solomon, M. (2005). Evidence based assessment of autism spectrum disorders in childre and adolescents. *Journal of Clinical Child and Adolescent Psychology*, *34*(3), 523-540. doi: 10.1207/s15374424jccp3403_8

Parham, L.D., Cohn, E.S., Spitzer, S., Koomar, J.A., Miller, L.J, Burke, J.P., Brett-Green,

B., Mailloux, Z., May-Benson, T.A., Roley, S.S. Schaaf, R.A., Schoen S.A., & Summers, C.A. (2007). Fidelity in sensory integration intervention research. *American Journal of Occupational Therapy*, *61*(2), 216-227. Retrieved from: http://www.ncbi.nlm.nih.gov/pubmed/17436844

Parsonson, B.S. (2003). Visual analysis of graphs: Seeing is believing. In K. S. Budd & T. Stokes, (Eds). *A Small Matter of Proof: The Legacy of Donald M. Baer*. (Pp. 35–51). Reno, NV: Context Press.

Pelham, W. E., Fabiano, G. A., & Massetti, G. M. (2005). Evidence based assessment of attention deficit hyperactivity disorder in children and adolescents.*Journal of Clinical Child and Adolescent Psychology*, *34*(3), 449–476. Retrieved from http://data.psych.udel.edu/abelcher/Shared Documents/1 Assessment (48)/c Diagnosis and assessment of specific problems/Pelham 2005.pdf

Roth, F. P., & Worthington, C. K. (2011). *Treatment resource manual for speech language pathology*. (4 ed.). NY: Cengage Brain. Retrieved from http://www.asha.org/uploadedFiles/publications/archive/Monographs14.pdf

Russo, D. C., Cataldo, M. F., & Cushing, P. J. (1981). Compliance training and behavioral covariation in the treatment of multiple behavior problems. *Journal of Applied Behavior Analysis*, *14*(3), 209-222. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/7298534

Sackett, D. L. (1996). Evidence based medicine: what it is and what it isn't . *British Medical Journal*, (312), doi: http://dx.doi.org/10.1136/bmj.312.7023.71

Schaaf, R. C., & Miller, L. J. (2005). Occupational therapy using a sensory integrative approach for children with developmental disabilities. *Mental Retardation and*

Developmental Disabilities Research Reviews,*11*(2), 143-148. Retrieved from http://www.spdfoundation.net/pdf/Schaaf_Miller2.pdf

Simpson, A., Bowers, L., Alexander, J., Ridley, C., & Warren, J. (2005). Occupational therapy and multidisciplinary working on acute psychiatric wards: the tompkins acute ward study. *British Journal of Occupational Therapy*, *68*(12), 545-552. Retrieved from: http://docserver.ingentaconnect.com/deliver/connect/cot/03080226/v68n12/s3.pdf?expires=1364235829&id=73488258&titleid=6174&accname=James Madison University&checksum=4DE8C15379C1DD8A183939DEEE5CAAB6

Smith, S.W. (1990). Individualized Education Programs in Special Education—From intent to Aquiescence. Execptional Children. *57*(1), 6-14. Retreived from:http://ehis.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=59bc1ca0-8ade-4e20-81d7-47b7493224e9%40sessionmgr112&vid=2&hid=102

St. Peter, C. (2013). Changing course through collaboration. *The Behavior Analyst*, *36*(1), 155-160.

Wilbarger, P. & Wilbarger, J. L. (1991). Sensory defensiveness in children aged 2-12. Santa Barbara, CA: Avanti Educational Programs.

Wisconsin Indian head technical college occupational therapy assistant student handbook. (pp. 1-5). Retrieved from http://www.witc.edu/pgmpagescontent/ota/handbook/pdfs/i-OTA practice defintions.pdf

Wolf, M. M. (1978). Social validity: The case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis, 11*,

203-214. Retreived from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1311293/pdf/jaba00109-0003.pdf

World Health Organization. (2010). Framework for action on interprofessional education & collaborative practice. *Health Profession Networks Nursing & Midwifery Human Resources for Health*. Retrieved from http://whqlibdoc.who.int/hq/2010/WHO_HRH_HPN_10.3_eng.pdf

Youngstrom, M., Brayman, S., Anthony, P., Brinson, M., Brownrigg, S., Clark, G., Roley, S., Sellers, J., Van Slyke, N., Desnarausm S., Oldham, J., Radomski, M. & Hertfelder, S. (2002). Occupational therapy practice framework: domain and process. *The American Journal of Occupational Therapy*, *56*(6), 609-639. Retrieved from http://ajot.aotapress.net/content/56/6/609.full.pdf

Zipoli, R. P., & Kennedy, M. (2005). Evidence-based practice among speech-language pathologists.*American Journal of Speech-Language Pathology*,*14*, 208-220. doi: doi:10.1044/1058-0360(2005/021)